

THE WINTER CRANE FLIES OF NORTH AMERICA NORTH OF MEXICO  
(DIPTERA: TRICHO CERIDAE)

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*Abstract.*—Twenty-eight species of winter crane flies in the family Trichoceridae are found in North America north of Mexico: *Diazosma pratti* Stary, *D. subsinuatum* Alexander, *Paracladura trichoptera* (Osten Sacken), *Trichocera* (*Metatrichocera*) *colei* Alexander, *T. (M.) garretti* Alexander, *T. (M.) lutea* Becher, *T. (M.) mackenzie* (Dahl), *T. (M.) salmani* Alexander, *T. (M.) tetonensis* Alexander, *T. (M.) ursamajor* Alexander, *Trichocera* (*Trichocera*) *annulata* Meigen, *T. (T.) arctica* Lundström, *T. (T.) arnaldi* Pratt, n. sp., *T. (T.) bauffi* Pratt, n. sp., *T. (T.) bimacula* Walker, *T. (T.) bituberculata* Alexander, *T. (T.) borealis* Lackschewitz, *T. (T.) brevicornis* Alexander, *T. (T.) columbiana* Alexander, *T. (T.) excilis* Dahl, *T. (T.) fattigiata* Alexander, *T. (T.) gracilis* Walker, *T. (T.) hiemalis* (De Geer), *T. (T.) idahoensis* Pratt, n. sp., *T. (T.) maculipennis* Meigen, *T. (T.) pallens* Alexander, *T. (T.) regelationis* (Linnaeus), and *T. (T.) setosivena* Alexander. *Trichocera longisetosa* Alexander is a new synonym of *Trichocera* (*Trichocera*) *setosivena* Alexander. Keys to genera and species, notes on distributions, and illustrations are provided.

*Key Words:* Diptera, Trichoceridae, winter crane flies, North America, taxonomy

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Winter crane flies of the genus *Trichocera* Meigen are found on warm sunny afternoons in fall, winter, and spring in the contiguous United States, Canada, and Alaska. On the other hand, adults of the two species of *Diazosma* Bergroth are collected from June to September, the only trichocerids on wing in the summer in northern United States. Adults of *Paracladura trichoptera* (Osten Sacken) are found from August through the winter to spring in British Columbia, Washington, Oregon, and California. Swarms of *Trichocera* males are often seen dancing in the late afternoon sunlight, sometimes thousands of individuals in hundreds of swarms over many acres of lawns and open woodlands. Biologists also have noticed these coldhardy insects swarming above the snow, or specimens crawling on the snow when temperatures were between 0° and 10°C. Specimens in this study were

collected by net, light trap, Malaise trap, and molasses trap.

The following acronyms indicate the location of types:

ANSP	Academy of Natural Sciences, Philadelphia, PA., USA.
BMNH	The Natural History Museum, London, UK.
CAS	California Academy of Sciences, San Francisco, CA, USA.
CNC	Canadian National Collection, Ottawa, ON, Canada.
LSI	Linnean Society of London, London, UK.
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA.
MNHN	Muséum National d'Histoire Naturelle, Paris, France.
NMW	Naturhistorisches Museum, Wien, Austria.

- USNM National Museum of Natural History, Smithsonian Institution, Washington, DC, USA.
- ZIL Zoological Institute, Lund, Sweden.
- ZISP Zoological Institute, Academy of Sciences, St. Petersburg, Russia.

#### TAXONOMY

Alexander published two keys to the Trichoceridae found in the eastern United States (1919a, 1942) and one for the western United States (1967). He wrote a fine summary of the family Trichoceridae in the "Manual of Nearctic Diptera" in 1981. Dahl published many papers on winter crane flies. Dahl's 1966 publication on the Swedish Trichoceridae includes much information on several species found in North America, and her 1967 paper on arctic and subarctic Trichoceridae is the basic work on northern species. The world catalogue of Trichoceridae by Dahl and Alexander (1976) lists all the species known to 1976, references to the original descriptions, and known locations of types of most species. Pratt and Pratt (1984) published keys, illustrations and data on ten species of eastern North America. Pratt (1992) published a key to the Trichoceridae of North America.

Starý (1995) described *Diazosma pratti* and wrote that *Diazosma hirtipenne* (Siebke) is a European species and that North American records of this insect should be called *D. subsinuatum* (Alexander). Starý and Martinovsky (1996) wrote that *Trichocera japonica* Matsumura (1916) probably is not a North American species and that records of this species by Dahl and Alexander (1976) and Pratt (1992) should be called *Trichocera excilis* Dahl (1967). Krzeminska (2001) wrote that *Trichocera major* Edwards is a European species and that American records of this species should be called *Trichocera setosivena* Alexander.

*Trichocera scutellata* Say (1824) from Minnesota and *Trichocera brumalis* Fitch (1847) from New York are unrecognized

because their types are lost. They are not treated further here. *Trichocera gracilis* Walker (1848) was described from a single female from York Factory, Manitoba, Canada. Byers (1976) published notes and figures of the terminal abdominal segments of the type. I know of no characters to separate this species from females of other species.

#### FAMILY CHARACTERISTICS OF THE TRICHO CERIDAE

Winter crane flies in the family Trichoceridae are small to medium sized (wing up to 12 mm in *Diazosma*) with slender long legs similar to the true crane flies in the family Tipulidae. Trichoceridae differ in having 3 ocelli, the V-shaped suture on the mesonotum incomplete in the middle, and long hairlike antennae. Tipulidae lack ocelli, have a complete V-shaped suture on the mesonotum separating the praescutum and scutum, and antennae usually short. True crane flies are often much larger than winter crane flies, with wings up to 25 mm or more.

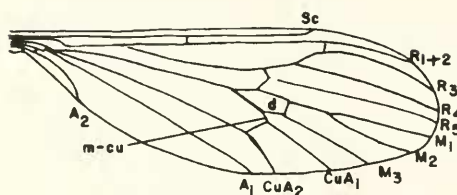
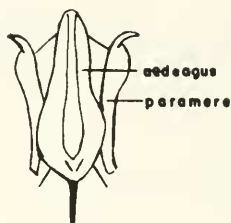
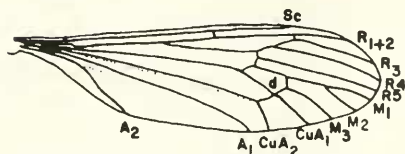
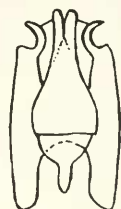
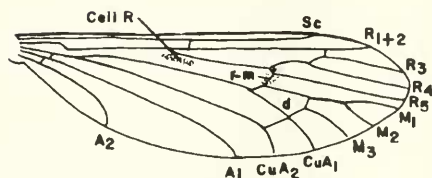
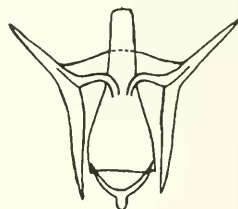
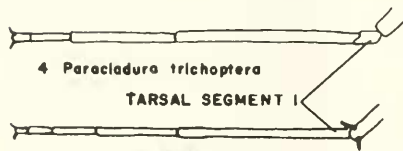
Description.—Head with 3 ocelli. Antenna with 16 "segments," scape and pedicel enlarged, flagellomeres 3–16 elongate and progressively more slender. Mouthparts reduced, mandibles absent, galea of maxilla well-preserved, palpus with 4 free segments, no trace of sensory pore (as in *Sylvicola* Harris and *Culicoides* Latreille). Thorax with V-shaped suture separating praescutum and scutum incomplete in middle, and no distinct suture separating scutum and scutellum. Wing with Sc long joining C at midlength, 4 branches of R and 3 branches of M reaching wing margin, A<sub>1</sub> long, A<sub>2</sub> short and curved to wing margin in *Trichocera* and *Paracladura* Brunetti longer and subsinuous in *Diazosma*. Legs not markedly deciduous as in Tipulidae: Abdomen with 8 distinct pregenital segments, first segment short. Male genitalia with medio-basal projections of gonocoxites forming incomplete or complete bridge, gonostylus single, phallosome with aedeagus or sperm pump somewhat pearshaped

and parameres joined medially by thin membrane. Female with ovipositor formed by sclerotized, elongate, downward curved cerci in *Trichocera* and *Paracladura* or short and fleshy in *Diazosma*.

KEY TO THE WINTER CRANE FLIES  
(TRICHO CERIDAE) OF NORTH AMERICA  
NORTH OF MEXICO

1. Tarsi with basitarsomere very short, about one-eighth as long as second tarsomere (Fig. 4); wing with m-cu crossvein present (Fig. 1); female with one spermatheca (Fig. 32) (*Paracladura*, one species, BC, WA, OR, CA) . . . . . *Paracladura trichoptera* (Osten Sacken)
- Tarsi with basitarsomere longer than second (Fig. 5); wing with m-cu crossvein absent (Figs. 2-3); female with 3 spermathecae . . . . . 2
2. Wing with A<sub>1</sub> long, subsinuous, not curved evenly to wing margin (Fig. 2); tibial spurs absent (Fig. 4); ovipositor short, oval, fleshy (*Diazosma*) . . . . . 29
- Wing with A<sub>1</sub> vein short, curved evenly to wing margin (Fig. 3); tibial spurs present (Fig. 5); ovipositor short to long, tapering markedly to tip, curved downward (*Trichocera*) . . . . . 3
3. Gonostylus with one or more lobes or swellings; gonocoxites frequently enlarged, bridge connecting gonocoxites complete, often with protuberance in middle (Figs. 9-15) (*Trichocera* (*Metatrachocera*)) . . . . . 4
- Gonostylus simple, or with basal swelling or protuberance; gonocoxites not markedly enlarged; bridge connecting gonocoxites complete or incomplete, without protuberance in middle (Figs. 16-30) (*Trichocera* (*Trichocera*)) . . . . . 10
4. Distal portion of gonostylus cylindrical, not enlarged or strongly expanded (Figs. 9-12) . . . . . 5
- Distal portion of gonostylus expanded, complex, often somewhat club-shaped (Figs. 13-15) . . . . . 8
5. Lobe on basal portion of dististylus short, about as long as width of gonostylus at point of attachment (Figs. 9-10) . . . . . 6
- Lobe on basal portion of dististylus long, two or more times as long as width of gonostylus at point of attachment (Figs. 11-12) . . . . . 7
6. Lobe on gonostylus with blunt tip, distal part of gonostylus beyond lobe with mesal face densely set with short dark setae; bridge connecting gonocoxites without pointed protuberance in middle (AK, BC, CA across northern U.S.) (Fig. 9) . . . . . *garretti* Alexander
- Lobe on gonostylus with pointed tip; distal

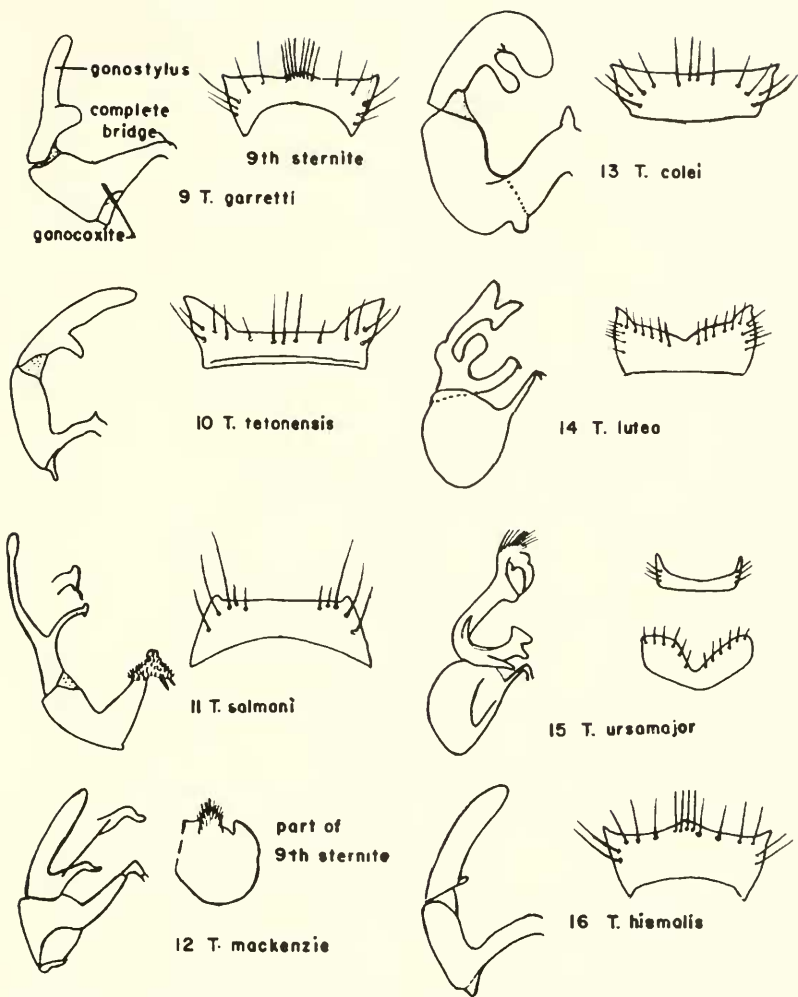
- portion of gonostylus beyond lobe with sparse long setae; bridge connecting gonocoxites with pointed protuberance in middle (Fig. 10) (AK, OR, northwestern U.S.) (Fig. 10) . . . . . *tetonensis* Alexander
7. Lobe of gonostylus at basal fourth of gonostylus; lateral lobes of ninth tergite with dense brush of long, reddish hairs 9th sternite flat (Fig. 11) (NH, MA, MD west to KS) . . . . . *salmani* Alexander
  - Lobe of gonostylus arising at base of gonostylus; later lobes of ninth tergite with a few sparse hairs; ninth sternite balloon-like with setose dorsal lobe (Fig. 12) (AK, northwestern Canada) . . . . . *mackenzie* Dahl
  8. Basal and distal portions of gonostylus with large irregular rounded lobe (Fig. 14) (Greenland) . . . . . *lutea* Becher
  - Base of gonostylus without large round lobe . . . . . 9
  9. Tip of gonostylus with large rounded lobe (Fig. 11) (AK, BC, WA, OR, CA) . . . . . *colei* Alexander
  - Tip of gonostylus with very complex enlargement and conspicuous brush of setae (Fig. 15) (YT, NWT) . . . . . *ursamajor* Alexander
  10. Wing with a distinct dark spot in Cell R behind origin of RS and a dark cloud over r-m crossvein (Fig. 3) . . . . . 11
  - Wing without a dark spot in Cell R, entirely clear or with a dark cloud over r-m crossvein . . . . . 12
  11. Gonostylus simple; 9th sternite deeply concave in middle of posterior margin and without setae in middle (Fig. 17) (eastern U.S. and Canada) . . . . . *himaclula* Walker
  - Gonostylus with small pointed tubercle; 9th sternite with two low bulges near middle of posterior margin and setae along posterior margin (Fig. 18) (BC to QC) . . . . . *maculipennis* Meigen
  12. Abdomen distinctly annulate, tergites obscurely yellowish with posterior margins brownish (CA, OR, NFD, NY, CT, MD, VA) (Fig. 19) . . . . . *annulata* Meigen
  - Abdomen entirely dark, or dark above and pale beneath with two color meeting essentially in a straight line laterally . . . . . 13
  13. Wing with distinct cloud over r-m crossvein (eastern U.S. and Canada) (Fig. 20) . . . . . *regelationis* (L.)
  - Wing clear, sometimes with slight cloud in stigmal are. i.e., Cell R<sub>1</sub> . . . . . 14
  14. Scape of antenna and thorax pale orange brown; abdomen with dorsum dark, venter pale, the two colors meeting laterally essentially in a straight line (CA, WA, BC) . . . . . *arnandi*, n. sp.

1 *Paracladura trichoptera*6 *Paracladura trichoptera*2 *Diaosma subsinuatum*7 *Diaosma subsinuatum*3 *Trichocera bimaculata*8 *Trichocera fattigiana*4 *Paracladura trichoptera*

TARSAL SEGMENT I

5 *Trichocera bimaculata*

Figs. 1-8. 1, Wing, *Paracladura trichoptera*, San Francisco, CA. 2, Wing, *Diaosma subsinuatum*, Halifax Gorge, VT. 3, Wing, *Trichocera bimaculata*, Atlanta, GA. 4, Tarsus, *P. trichoptera*, San Francisco, CA. 5, Tarsus, *T. bimaculata*, Atlanta, GA. 6, Male genitalia, *P. trichoptera*, San Francisco, CA. 7, Male genitalia, *D. subsinuatum*, Halifax Gorge, VT. 8, Male genitalia, *T. fattigiana*, Atlanta, GA.



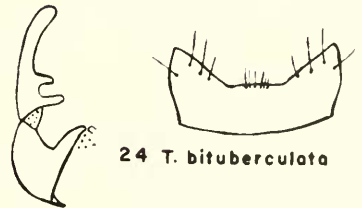
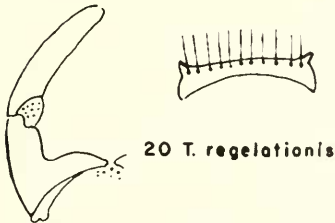
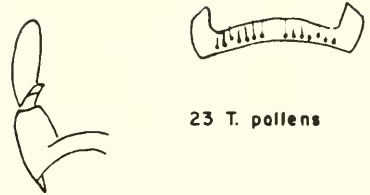
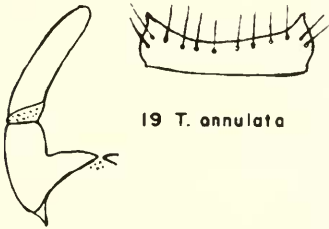
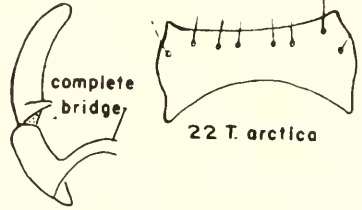
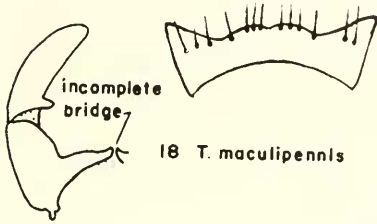
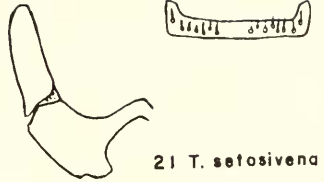
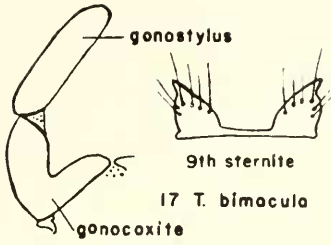
Figs. 9-16. Male genitalia details. 9, *Trichocera garretti*, Atlanta, GA. 10, *T. tetonensis*, Waterston National Park, AB, Canada. 11, *T. salmoni*, Amherst, MA. 12, *T. mackenzie*, Masseur, Sweden. 13, *T. lutea*, Moravia. 15, *T. ursamajor*, redrawn from Dahl (1967). 18, *T. hiemalis*, Atlanta, GA.

- Scape of antenna, thorax and abdomen dark ..... 15
15. Male with complete bridge joining gonocoxites (Figs. 16, 21-23) ..... 16
- Male with incomplete bridge joining gonocoxites (Figs. 24-27) ..... 19
16. Gonostylus simple (Fig. 21); wing with long trichia, those on distal portion of wing veins about as long as basal portion of  $R_2$  ..... *setosivena* Alexander
- Gonostylus with basal protuberance or tubercle (Figs. 16, 22-23) wing without trichia on wing veins ..... 17
17. Male with 9th sternite usually with an obtuse point in middle of posterior margin (Fig. 16); first flagellar segment of antenna elongate, 3 to 4 times as long as basal width. .... *hiemalis* (De Geer)
- Male 9th sternite without a point in middle of posterior margin; first flagellar segment of antenna about as long as following segments . . . . . 18
18. Male 9th sternite with few setae near middle of posterior margin (AK, northern Canada) (Fig. 22) ..... *arctica* Lundström
- Male 9th sternite with many setae near middle of posterior margin (CA, OR) (Fig. 23) . . . . . *pallens* Alexander
19. Halves of incomplete bridge slender, arising from mid-length of gonocoxites (Figs. 34-35); parameres about as long as aedeagus ..... 20
- Halves of incomplete bridge broader, arising near base of gonocoxites (Figs. 24-27, 29-30); parameres longer than aedeagus ..... 21
20. Gonostylus stout, tip rounded (Fig. 34); parameres with broad tip (ID) . . . *idahoenis*, n. sp.
- Gonostylus slender, tip pointed (Fig. 35); parameres with pointed tips (AB) . . . *baniffi*, n. sp.
21. Gonostylus with 2 tubercles, one at base larger than one at basal third (Fig. 24) (AK, MA, NH) ..... *bituberculata* Alexander
- Gonostylus with one basal tubercle, a setigerous protuberance, or simple (Figs. 25-27, 29-30) ..... 22
22. Gonostylus with basal tubercle (Fig. 25), parameres strongly angled, with spur beyond middle of aedeagus (Fig. 8); both sexes with last segment of palpus not constricted in middle (CT south to GA, west to MS) ..... *fattigiana* Alexander
- Gonostylus with basal setigerous protuberance or swelling, or simple (Figs. 26-27, 29-30); parameres gently curved, somewhat scimitar-shaped; last segment of palpus constricted in middle ..... 23
23. Gonostylus with basal setigerous protuberance or swelling (Figs. 26-27) ..... 24
- Gonostylus simple (Figs. 29-30) ..... 26
24. 9th sternite with posterior margin deeply scooped or concave, with 4 to 8 setae along posterior margin between postero-lateral corners (Fig. 26) (Canada, AK) ..... *excilis* Dahl
- 9th sternite with posterior margin slightly concave or straight usually with 10 or more setae between postero-lateral corners ..... 25
25. Setae along posterior margin of 9th sternite almost all of same size (eastern U.S. and Canada) ..... *regelationis* (L.)
- Setae along posterior margin of 9th sternite of more than one size (Fig. 27) (AK, northern Canada) ..... *borealis* Lackschewitz
26. Male 9th sternite with posterior margin deeply concave, without setae in middle portion (Fig. 17) (eastern U.S. and Canada) . . . . . *bimaculata* Walker
- Male 9th sternite shallowly concave or straight along posterior margin, with setae all along posterior margin between postero-lateral corners (Figs. 20, 29-30) ..... 27
27. Male 9th sternite with 10 or more setae along posterior margin between postero-lateral corners (eastern U.S. and Canada) ..... *regelationis* (L.)
- Male 9th sternite with 6 to 8 setae along posterior margin between postero-lateral corners ..... 28
28. Aedeagus with short basal apodeme and only slight trace of longitudinal groove (Fig. 29) (eastern U.S. and Canada) ..... *brevicornis* Alexander
- Aedeagus with longer basal apodeme and longitudinal groove (Fig. 30) (western U.S. and Canada) ..... *columbiana* Alexander
29. Male gonocoxites very stout, inflated with basal lobes forming distinct bridge; gonostylus slightly broadened distally, its tip rounded; female with tergite 10 subequal in length to cercus; spermatheca ovoid, with long sclerotized duct, subequal to spermathecal diameter (Fig. 31) (CO, ME, NH, VT, QC) ..... *Diazosma subsinuatum* (Alexander)
- Male gonocoxites comparatively slender, without apparent bridge; gonostylus slender before apex into more or less obtuse tip; female with tergite 10 longer than cercus; spermatheca spherical with sclerotized duct less than half spermathecal diameter) (Fig. 36) (OR, UT) ..... *Diazosma pratti* Starý

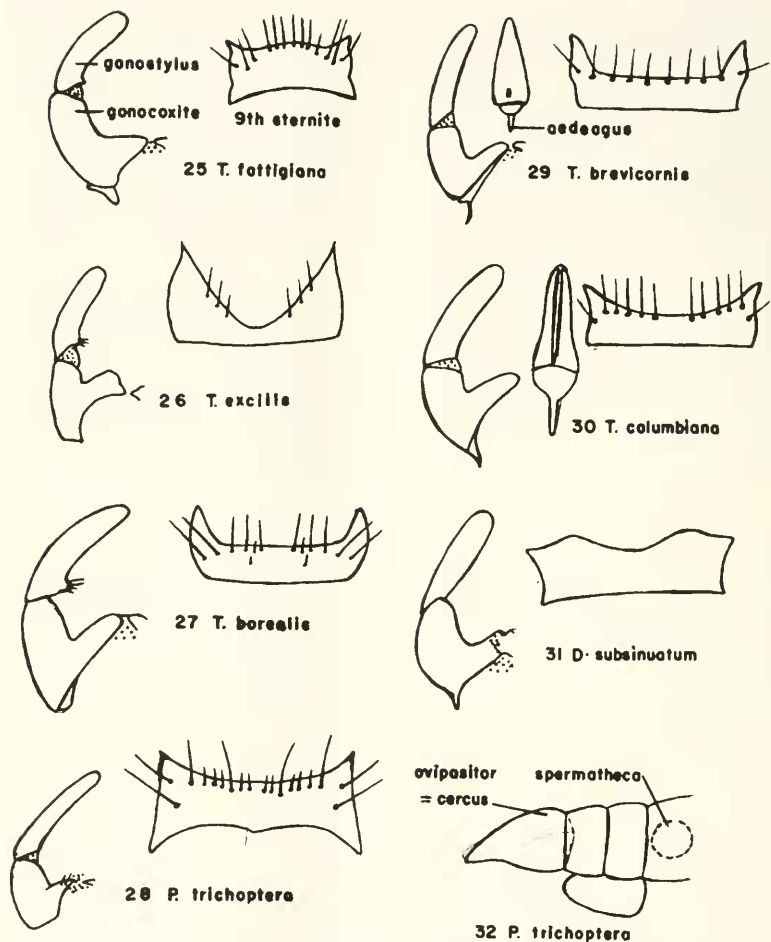
## SPECIES

*Diazosma Pratti* Starý  
(Fig. 36)

*Diazosma pratti* Starý 1995: 210-213, figs. 5-8. Holotype ♂. Cowly Canyon, Cache



Figs. 17-24. Male genitalia details. 17, *Trichocera bimaculata*, Atlanta, GA. 18, *T. maculipennis* Bear Island. 19, *T. annulata*, Arlington, VA. 20, *T. regelationis*, Ithaca, NY. 21, *T. setosivena*, Boyer, OR. 22, *T. arctica*, Banff, AB, Canada. 23, *T. pallens*, Santa Cruz Co., CA. 24, *T. bituberculata*, Amherst, MA.



Figs. 25–32. 25–31, Male genitalia details. 25, *Trichocera fattigiana*, Atlanta, GA. 26, *T. excilis*, redrawn from Stary and Martinovsky (1996), Dawson, YT, Canada. 27, *T. borealis*, Aklavik, NT, Canada. 28, *Paracladura trichoptera*, San Francisco, CA. 29, *T. brevicornis*, Atlanta, GA. 30, *T. columbiana*, Pullman, WA. 31, *Diazosma subsinuatum*, Halifax Gorge, VT. 32, Female abdomen, *P. trichoptera*, Marin Co., CA.

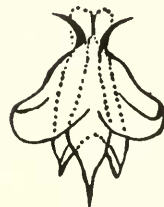
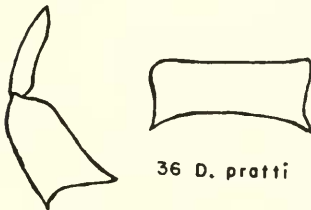
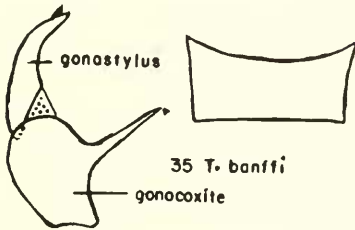
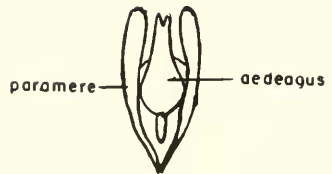
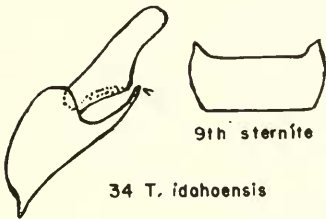
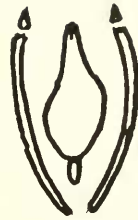
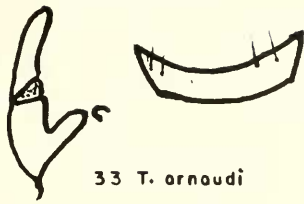
Co., UT in collection J. Stary, Faculty of Science, Olomouc, Czech Republic.

Geographic range.—UT and OR (Stary 1995).

*Diazosma subsinuatum* Alexander  
(Figs. 2, 7, 31)

*Trichocera (Diazosma) subsinuatum* Alexander 1916: 124–125, fig. 10. Holotype





Figs. 33-36. Details of male genitalis. 33. *Trichocera arnaudi*, Inverness, CA. 34. *T. idahoensis*, Moscow Mt., ID. 35. *T. banffi*, Banff, AB, Canada. 36. *Diazosma pratti*, Cache Co., UT.

♂, Hall Valley, Platte Canyon, CO. Carcass and slide in USNM.

Geographic range.—BC to CA across southern Canada and northern U.S. east to NY and VT (Alexander 1967, Pratt and Pratt 1984).

*Paracladura trichoptera* (Osten Sacken)  
(Figs. 1, 6, 28, 32)

*Trichocera trichoptera* Osten Sacken 1877: 204. Holotype ♀, Lagunitas Creek, Marin Co., CA in MCZ

Geographic range.—BC, WA, OR, CA (Alexander 1967)

*Trichocera (Metatrachocera) colei*  
Alexander  
(Fig. 13)

*Trichocera colei* Alexander 1919: 162. Holotype ♂, Forest Grove, OR, carcass and slide in USNM.

Geographic range.—AK, BC, WA, OR, CA (Alexander 1967).

*Trichocera (Metatrachocera) garretti*  
Alexander  
(Fig. 9)

*Trichocera garretti* Alexander 1927: 71–72. Holotype ♂, Marysville, BC, Canada, slide only, no carcass in USNM

*Trichocera alexanderi* Dahl 1967:59, figs. 7–10. Holotype ♂, Mt. Robson, BC, Canada in CNC. Synonymy by Dahl and Alexander (1976).

Geographic range.—AK to CA east across southern Canada and northern U.S. to NH and GA (Pratt and Pratt 1984).

*Trichocera (Metatrachocera) lutea* Becher  
(Fig. 14)

*Trichocera lutea* Becher 1886: 64. Holotype ♂, Jan Mayen in NMW.

Geographic range.—Jan Mayen, Spitzbergen, Bear Island, Greenland, Iceland, Fennoscandia, northwestern Russia, Alps (Dahl and Alexander 1976).

*Trichocera (Metatrachocera) mackenzie*  
(Dahl)  
(Fig. 12)

*Metatrachocera mackenzie* Dahl 1967: 60–63, figs. 11–15, 56–60. Holotype ♂, Mackenzie Delta, NWT, Canada in CNC.

Geographic range.—AK, northern Canada, northern Sweden. (Dahl and Alexander 1976).

*Trichocera (Metatrachocera) salmani*  
Alexander  
(Fig. 11)

*Trichocera salmani* Alexander 1927: 72. Holotype ♂, Amherst, MA, slide only, no carcass in USNM.

Geographic range.—MA, MD, KS, NH (Pratt and Pratt 1984).

*Trichocera (Metatrachocera) tetonensis*  
Alexander  
(Fig. 10)

*Trichocera tetonensis* Alexander 1945: 398, figs. 1, 2. Holotype ♂, Hidden Falls, stn. 3 WY in USNM, carcass only, no slide.

*Trichocera hyaloptera* Alexander 1949: 274, fig. 3. Holotype ♂, Peavine Ridge, Yamhill Co., OR, carcass only, no slide in USNM. Synonymy by Dahl and Alexander (1976).

Geographic range.—AK, OR, northern Canada, northern U.S. (Dahl and Alexander 1976).

*Trichocera (Metatrachocera) ursamajor*  
Alexander  
(Fig. 15)

*Trichocera ursamajor* Alexander 1959: 58. Holotype ♂, Bear Lake, NWT, Canada, slide only in USNM

Geographic range.—AK, northern Canada (Dahl and Alexander 1976).

*Trichocera (Trichocera) annulata* Meigen  
(Fig. 19)

*Trichocera annulata* Meigen 1818:215. Holotype ♂, Austria in MNHN.

Geographic range.—Western Canada, Europe, Asia Minor, Ethiopia, southern Australia, New Zealand, CA, AK, BC, NY, NJ, VA. (Alexander 1967, Pratt and Pratt 1984).

*Trichocera (Trichocera) arctica*  
Lundström  
(Fig. 22)

*Trichocera arctica* Lundstrom 1915: 28, figs. 11, 41, 42. Holotype ♂, Russia in ZISP (teste Dahl and Alexander 1976).

Geographic range.—AK and northern coasts of Russia (Dahl and Alexander 1976).

*Trichocera (Trichocera) bimaculata* Walker  
(Figs. 3, 5, 17)

*Trichocera bimaculata* Walker 1848:84. Lectotype ♂ NS, Canada in BMNH. *Trichocera venosa* Dietz 1921: 236, Holotype ♀, Hazelton, PA in ANSP. *Trichocera femaldi* Alexander 1927: 70. Holotype ♂, Amherst, MA, carcass and slide in USNM.

Geographic range.—NS, Canada, eastern and central U.S. (Pratt and Pratt 1984).

*Trichocera (Trichocera) bituberculata*  
Alexander  
(Fig. 24)

*Trichocera bituberculata* Alexander 1924: 81. Holotype ♂, Bethel, AK, carcass and slide in USNM.

Geographic range.—AK, MA, NH (Pratt and Pratt 1984).

*Trichocera (Trichocera) borealis*  
Lackschewitz  
(Fig. 27)

*Trichocera borealis* Lackschewitz 1934: 3, figs. 1a–c. Type ♂, Longyaarsbyen, Spitzbergen, probably in BMNH.

Geographic range.—AK, northern Canada, Greenland, Spitzbergen, northern Russia (Dahl and Alexander 1976).

*Trichocera (Trichocera) brevicornis*  
Alexander  
(Fig. 29)

*Trichocera brevicornis* Alexander 1952:89. Holotype ♂, Atlanta, GA, carcass and slide in USNM.

Geographic range.—Eastern U.S. VT to GA (Pratt and Pratt 1984).

*Trichocera (Trichocera) columbiana*  
Alexander  
(Fig. 30)

*Trichocera columbiana* Alexander 1927: 70. Holotype ♂, Prince Rupert BC, carcass and slide in USNM.

Geographic range.—AK, BC, WA, OR, CA (Alexander 1967).

*Trichocera (Trichocera) excilis* Dahl  
(Fig. 26)

*Trichocera excilis* Dahl 1967:71, figs. 43–45. Holotype ♂, Dawson, YT, Canada in CNC.

Geographic range.—AK, YT (Dahl 1967).

*Trichocera (Trichocera) fattigiana*  
Alexander  
(Figs. 8, 25)

*Trichocera fattigiana* Alexander 1952: 88. Holotype ♂, Atlanta, GA, carcass and slide in USNM.

Geographic range.—Eastern and central U.S. (Pratt and Pratt 1984).

*Trichocera (Trichocera) hiemalis*  
(De Geer)  
(Fig. 16)

*Tipula hiemalis* De Geer 1776:360, figs. XXI: 1–4. Neotype ♂, Lund, Sweden (Dahl 1966:101) in ZIL.

Geographic range.—Eastern Canada, eastern U.S., MA to GA, Europe (Pratt and Pratt 1984).

*Trichocera (Trichocera) maculipennis*  
Meigen  
(Fig. 18)

*Trichocera maculipennis* Meigen 1818: 214. Type, Austria, non-existent (*teste* Dahl and Alexander 1976).

Geographic range.—European species found in southern Canada and Greenland (Alexander 1965).

*Trichocera (Trichocera) pallens* Alexander  
(Fig. 23)

*Trichocera pallens* Alexander 1954: 25. Holotype ♂, Saddle Mountain, Boyer, OR, carcass in USNM, slide in CAS.

Geographic range.—CA, OR (Alexander 1967).

*Trichocera (Trichocera) regelationis*  
(Linnaeus)  
(Fig. 20)

*Tipula regelationis* Linnaeus 1758: 587. Type, Sweden, in LSL, without abdomen according to Dahl and Alexander (1976).

Geographic range.—Europe; ON, Canada; eastern U.S. (Pratt and Pratt 1984).

*Trichocera (Trichocera) setosivena*  
Alexander

*Trichocera (Trichocera) setosivena* Alexander 1927: 68. Holotype ♂, Seward, AK, carcass and slide in USNM.

*Trichocera longisetosa* Alexander 1927: 69. Holotype ♂, Lake Cushman, WA, carcass and slide in USNM. **New synonymy.**

Geographic range.—AK, WA, OR, CA (Alexander 1967).

*Trichocera (Trichocera) arnaudi* Pratt,  
**new species**  
(Fig. 33)

Description.—Scape of antenna and thorax pale orange brown. Abdomen with dorsum dark and venter pale, two colors meeting somewhat in straight line laterally. Coxae, trochanters, and bases of femora pale

orange brown, rest of femora, tibiae, and tarsi black. Wing 5 mm. Total length from head to tip of abdomen 5 mm.

Male terminalia (Fig. 33) with gonocoxites slender, shorter than gonostylus, with incomplete bridge and slender hook like basal apodeme; gonostylus somewhat parallel-sided, with rounded tip; aedeagus pear-shaped, with basal apodeme and long slender tip; parameres twisted in type slide, slightly longer than aedeagus, with pointed tips.

Types.—Holotype ♂ carcass and slide, California, Marin Co., Inverness, I-13-XII-1963, Paul H. Arnaud. In CAS. 6 paratypes in CAS from Inverness, CA; San Mateo County, CA; El Cerrito, CA; Fort Lewis, WA; and Pullman WA. Additional specimens in poor condition have been seen from several localities in California and British Columbia.

**Etymology.**—This species is named in honor of Paul H. Arnaud, Curator of Entomology at CAS, who collected the type specimens and provided many of the specimens on which this study is based.

**Remarks.**—This species may be confused with *Paracladura trichoptera* because generic distinctions are often difficult to see. Both have the scape and thorax pale orange brown. *Paracladura trichoptera* has the wing and wing margin with abundant fine setae, whereas *Trichocera arnaudi* has the wing clear without fine setae.

*Trichocera (Trichocera) banffi* Pratt,  
**new species**  
(Fig. 35)

Description.—Head, thorax, and abdomen black. Antenna missing. Wing clear, 5 mm. Length 4 mm.

Male terminalia (Fig. 35) with incomplete bridge arising from the middle of each gonocoxite, very slender and pointed; gonostylus slender, tapering to a point; parameres about as long as aedeagus, with pointed tips; aedeagus pear-shaped, with short basal apodeme and pointed, slender tip. 9th sternite transverse, without setae.

Type.—Holotype ♂ carcass and slide, Banff, Alberta, Canada, IX-20-1928, O. Bryant, at light, in CAS.

Etymology.—Named for Banff, the type locality.

Remarks.—*Trichocera banffi* and *Trichocera idahoensis* are very distinct from other *Trichocera* in having the incomplete, very slender, pointed bridge arising from the middle of the gonocoxites. *Trichocera banffi* is separated from *T. idahoensis* by the slender gonostylus with the tip pointed (Fig. 35) (stout with tip rounded in *T. idahoensis*, Fig. 34), and the pointed tips of the parameres (broad in *T. idahoensis*).

*Trichocera (Trichocera) idahoensis* Pratt,  
new species

(Fig. 34)

Description.—Male, head, thorax, and abdomen black. Wing clear, about 7 mm. One fore leg without tarsi.

Male terminalia (Fig. 34) with gonocoxite stout, with rounded tip and triangular projection in middle; long, slender, incomplete bridge, each half arising from middle of respective gonocoxite. Aedeagus long and slender, tip notched, with long, darkened, basal apodeme, flanked by short parameres about as long as aedeagus, with blunt tips. 9th sternite with straight posterior margin and pointed postero-lateral corners apparently without setae.

Type.—Holotype ♂ carcass and slide, Moscow Mt., Idaho, 10 Sept., 1916, A. L. Melander. In ANSP.

Etymology.—This species is named for the type locality, Idaho.

Remarks.—The two new species, *Trichocera idahoensis* and *Trichocera banffi* differ from other *Trichocera* in having a very slender, long, incomplete bridge, each half arising from the middle of the gonocoxite, and by very short parameres, about as long as the aedeagus. See remarks under *T. banffi* and key.

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